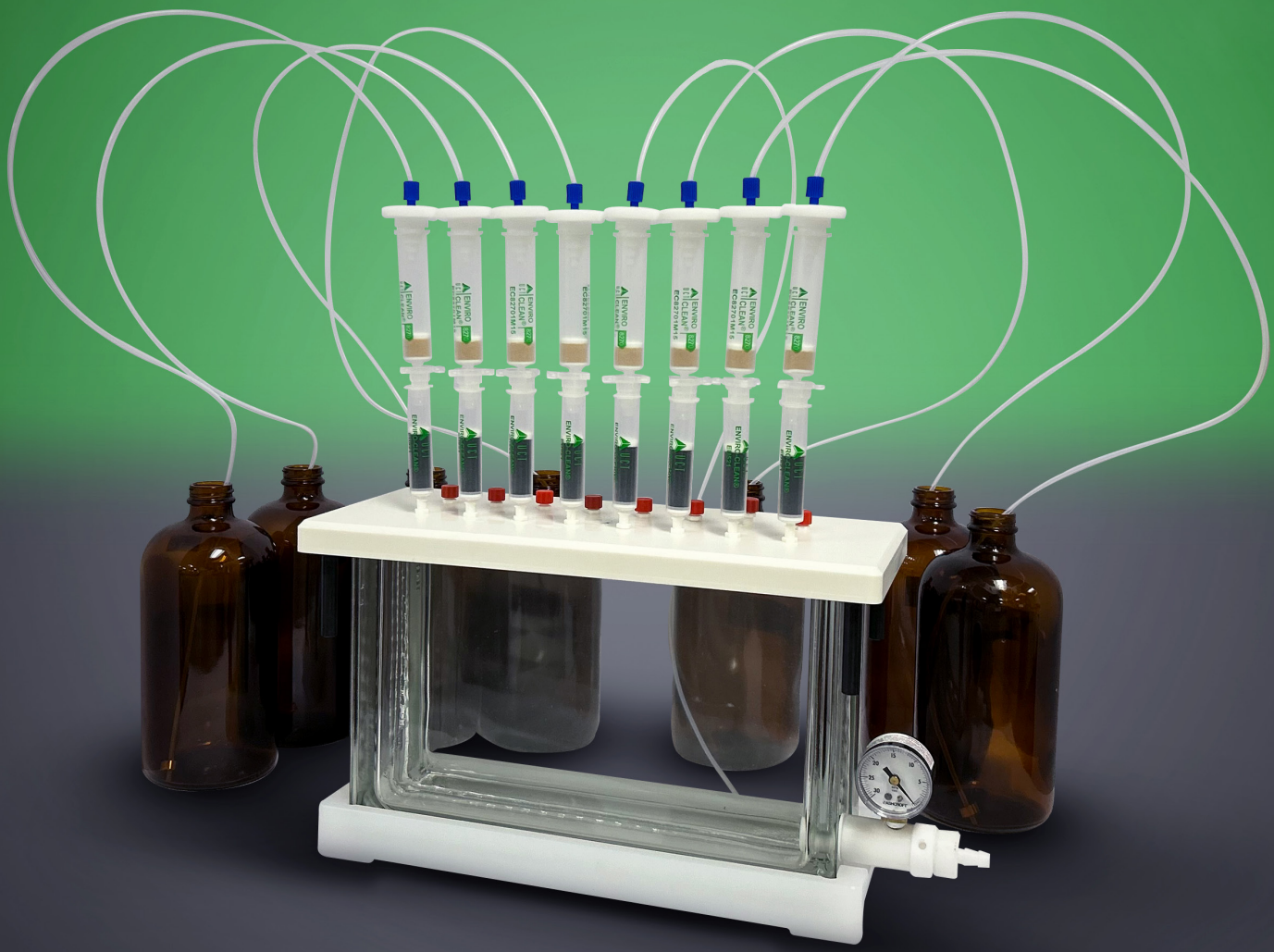
ENVIRO

UCT

DUAL CARTRIDGE SYSTEM

For The Extraction of Acids, Bases, And Neutrals In Water



ENVIRO-CLEAN® METHOD 8270

ENVIRO-CLEAN® METHOD 8270

UCT, Inc. offers a unique, 2 cartridge system and extraction procedure for EPA Method 8270. The procedure is reliable, efficient, and cost-effective. The tandem cartridge system uses UCT's proprietary 8270 cartridges in-line with our activated carbon cartridges. High throughput can be achieved by extracting multiple samples simultaneously using a multi-port SPE manifold combined with a 12 position collection rack, which allows for the simultaneous extraction of up to 12 samples at once. A set of 24 samples should be able to be extracted in 5 to 6 hours.

A wide range of 133 target analytes and 6 surrogates can be successfully analyzed using this method. The UCT 8270 cartridge retains the majority of the target analytes including acids, bases, and neutrals; meanwhile the carbon cartridge, connected downstream from the 8270 cartridge, captures several very polar compounds, such as n-Nitrosodimethylamine, n-Nitrosomethylethylamine, methyl methanesulfonate, ethyl methanesulfonate, and 1-Nitrosopyrrolidine.

Product Benefits

- Cost-effective
- Reduced usage of organic solvents
- Simple and fast: only one sample pass is needed
  - 5-6 hrs for a batch of 24 samples.
- No emulsion or white precipitate generated
- Shorter solvent evaporation time
- Shorter sample turnaround time
- High sample throughput
- Excellent recovery and reproducibility
- Cleaner extracts and chromatograms
- Cartridge body manufactured from special, proprietary polypropylene – minimizing potential source of interferences
- Packaged in Mylar to maintain cleanliness

ENVIRO-CLEAN® METHOD 8270

Extraction of Acids, Bases, and Neutral Compounds in Water Using Solid Phase Extraction and Hydrogen as Carrier Gas for GC/MS Analysis

8270 Cartridge Kits

UCT 8270 Cartridge:

EC82702M15
2000 mg 8270 Sorbent in 15 mL Cartridge

EC82701M15
1000 mg 8270 Sorbent in 15 mL Cartridge

EC8270506
500 mg 8270 Sorbent in 6 mL Cartridge

Carbon Cartridge:

EU52113M6
3000 mg Activated Carbon in 6 mL Cartridge

EU52112M6
2000 mg Activated Carbon in 6 mL Cartridge

EU5211M6
1000 mg Activated Carbon in 6 mL Cartridge

1 Liter Sample Size		
Part Number	Description	Units
EC8270-KIT1L	**ENVIRO-CLEAN® 8270 STARTER KIT**	Kit
Contents	30 x 8270 Extraction Cartridges (p/n EC82702M15), 30 x Carbon Extraction Cartridges (p/n EU52113M6), 30 x Cartridge Adapters (p/n AD0000AS), 12 x Large Volume Transfer Tubes (p/n VMFSTFR12)	
EC8270-1000REFL	**ENVIRO-CLEAN® 8270 REFILL KIT**	Kit
Contents	30 x 8270 Extraction Cartridges (p/n EC82702M15), 30 x Carbon Extraction Cartridges (p/n EU52113M6)	
500 mL Sample Size		
Part Number	Description	Units
EC8270-KIT	**ENVIRO-CLEAN® 8270 STARTER KIT**	Kit
Contents	30 x 8270 Extraction Cartridges (p/n EC82701M15), 30 x Carbon Extraction Cartridges (p/n EU52112M6), 30 x Cartridge Adapters (p/n AD0000AS), 12 x Large Volume Transfer Tubes (p/n VMFSTFR12)	
EC8270-500REFL	**ENVIRO-CLEAN® 8270 REFILL KIT**	Kit
Contents	30 x 8270 Extraction Cartridges (p/n EC82701M15), 30 x Carbon Extraction Cartridges (p/n EU52112M6)	
≤100 mL Sample Size		
Part Number	Description	Units
EC8270-KIT100ML	**ENVIRO-CLEAN® 8270 STARTER KIT**	Kit
Contents	30 x 8270 Extraction Cartridges (p/n EC8270506), 30 x Carbon Extraction Cartridges (p/n EU5211M6), 30 x Cartridge Adapters (p/n AD0000AS), 12 x Large Volume Transfer Tubes (p/n VMFSTFR12)	
EC8270-100REFL	**ENVIRO-CLEAN® 8270 REFILL KIT**	Kit
Contents	30 x 8270 Extraction Cartridges (p/n EC8270506) 30 x Carbon Extraction Cartridges (p/n EU5211M6)	

Extraction and Evaporation Accessories

Part Number	Description	Units
VMF016GL	16 Position Complete Vacuum Manifold System	Complete Unit
Contents	1 x Glass Block 1 x 16 Position Corian Lid 1 x Cover Gasket 1 x Vacuum Gauge 1 x 16 Position Adjustable Collection Rack 1 x Glass Block Safety Tray 16 x PTFE Tips 16 x Bulkhead Luer Fittings 16 x Plugs	
CLTTP050	CLEAN-THRU® Tips	50
ECROCKER400	Vacuum Pump (1/8 H.P. / 115V / 4.2amps / 60Hz)	1
ECUCTTRAP20	20 L Waste Trap	1
ECUCTTRAP20-ADPT	3/8" X 1/4" PVFD Adapter for fitting Waste Trap to Glass Block Manifold	1
VMF02125	12 Position Large Volume Collection Rack	1
VMFSPEVAP-32-220V	SPeVAP® 32 Position 220V Multi-Function Solvent Evaporator with Installation Kit	1
VMFSPEVAPCR-3252	SPeVAP® 32 Position 27-29mm VOA Vial Tray	1

ENVIRO-CLEAN® METHOD 8270

Instructions for Using ENVIRO-CLEAN® Method 8270 - Procedure

Methanol (MeOH) - HPLC grade
n-Hexane - HPLC grade (≥ 95% n-hexane)
6N Hydrochloric acid - (HCl)
Dichloromethane (DCM) - Pesticide grade, stabilized with amylene
Acetone - Pesticide grade
Ammonium hydroxide (28-30%) - ACS grade
Sodium thiosulfate - Enviro-Clean® Bulk Anhydrous Sodium Sulfate 25kg
Sodium Sulfate - ACS grade, anhydrous, granular 60 Mesh
(UCT part#: ECSS05K)

SPE Procedure

Sample Preparation Procedure

ENVIRO-CLEAN® 8270 Extraction Cartridges 2000 mg 15 mL (EC82702M15) and ENVIRO-CLEAN® 521 3000 mg Activated Carbon 6 mL (EU52113M6).

Sample Pre-treatment

a) Dechlorinate the 1-liter sample with 80 mg/L of sodium thio sulfate if free chlorine is present.
b) Adjust sample pH to < 2 using 6N HCl or H_2SO_4. (Check LCS and MB pH with a meter).
c) Spike with surrogates and target analytes for fortified samples.

Tip: *Prepare spiking solutions in water-miscible solvents to avoid degradation of the analytes during storage. Care should be taken, as some analytes will interact with one another when combined, therefore multiple spiking solutions (and possibly calibration standards) may need to be prepared. For more information, see 8270E section 1.4.14. Check with your reference material provider.*

SPE System Setup

a) Connect the carbon cartridge to the end of the 8270-cartridge using a cartridge adaptor (AD0000AS).
b) Insert a loose plug of deactivated glass wool into the 8270 cartridges to prevent the sorbent from clogging when samples contain a high particulate content. Please refer to EPA Method 3535A Section 11.1 for instructions if samples contain > 1% sediment.
c) Attach the large volume sample delivery tube to the top of the EC8270 cartridge.
d) Attach the connected SPE cartridges to the SPE manifold (VMF016GL).

Cartridge Conditioning

a) Sorbent rinsing - Insert the stainless-steel ends of the transfer tubes into a beaker containing dichloromethane (DCM) (15 mL per sample).
b) Apply vacuum for a few seconds to draw enough DCM through the SPE cartridges to rinse the sorbents (approximately 10 mL).
c) Allow the sorbent to soak in DCM for 1 min.
d) Slowly draw the remaining DCM to waste.
e) Apply full vacuum for 3 minutes to remove all the DCM from the sorbent.
f) Sorbent conditioning - Insert the stainless-steel ends of the transfer tubes into a beaker containing methanol (15 mL per sample).
g) Apply vacuum for a few seconds to draw enough methanol through the SPE cartridges to wet the sorbents (approximately 10 mL).
h) Slowly draw off the excess methanol to waste, leaving a layer above the frit.

Sample Loading

a) Insert the stainless-steel ends of the transfer tubes into each corresponding sample bottle.
b) Adjust vacuum for a fast dropwise sample flow (about 10-15 mL/min).
c) Draw the entire sample through the cartridges.

Rinse and Dry Cartridges

a) Rinse the sample bottle with 10 mL of deionized water. Allow water to pass through the SPE cartridge until dryness
b) Disassemble the 8270 SPE cartridge from the carbon cartridge and remove the adapter.
c) Place the 8270 cartridges with transfer tube and the carbon cartridges on separate positions on the glass block manifold.
d) Dry the 8270 cartridges under full vacuum for 10 minutes, and the carbon cartridges for 15 minutes.

Tip: *Remove as much water as possible. Wet sorbents will result in low recoveries. Full vacuum pressure should equal 25" Hg (635 mm Hg).*

Analyte Elution

a) Insert the collection rack (VMF02125) with 40-60 mL glass vials into the manifold.
b) Elute the 8270 and carbon cartridges separately. There will be separate elutions of the 8270 cartridges into 2 vials (Collection vial A and B).

Elution 1: EC8270 Cartridge - Collection Vial A

1. Place the EC8270 cartridge over Collection Vial A.
2. Add 10 mL of 1:9 acetone: n-hexane to the bottle and rinse it well.
3. Draw the solvent from the bottle into the EC8270 cartridge and let it soak for 2 minutes.
4. Dropwise, draw the solvent into Collection Vial A.
5. Turn this cartridge on full vacuum for 1 minute.

Tip: *The bottle rinse is critical for good recovery of PAHs which stick to glass. If recoveries of phenols or benzidine are not of concern, a higher concentration of acetone can be used for faster evaporation time.*
(i.e. 1:1 acetone:n-hexane)

Elution 2: EC8270 Cartridge - Collection Vial B

1. Place the EC8270 cartridge over Collection Vial B and add 10 mL of 18:2:80 IPA:NH_4OH:DCM to the cartridge.

Note: *This solvent must be made fresh daily, with NH_4OH less than 6 months old. Add ammonium hydroxide to IPA, stir, and then combine with DCM to ensure miscibility.*

2. Allow the solvent to soak for 2 minutes.
3. Dropwise, draw the solvent into Collection Vial B.
4. Turn this cartridge on full vacuum for 1 minute.
5. Repeat step (2) with 15 mL of DCM.

Elution 3: Carbon Cartridge

1. Add 15 mL of DCM to the carbon cartridge

Optional: *to remove excess water from the carbon cartridge, a 6 mL fritted reservoir filled with 3 g of DCM rinsed sodium sulfate can be attached in line with the carbon cartridge. This should not be done in place of the drying step, but as an additional measure.*

2. Allow the solvent to soak for 2 minutes.
3. Dropwise, draw the solvent into its collection vial.
4. Dry this cartridge on full vacuum for 1 minute.

Eluate Drying with Sodium Sulfate Anhydrous

a) Fill a 25 mL fritted reservoir with 15 to 20 g of Na_2SO_4 for each sample. Alternatively, use product ECUNIMSS (80 mL cartridge containing 20 g muffled sodium sulfate).

b) Rinse the sodium sulfate with DCM and discard the rinsate.

c) Place a 60 mL vial in the manifold to capture the dried eluate.

d) Pour each of the 3 eluents through the sodium sulfate and collect.

Tip: *If sodium sulfate starts to clump, agitate it with a glass stirring rod.*

e) Rinse each vial with 2 x 5 mL of DCM and transfer it to sodium sulfate. If the sodium sulfate is discolored, continue rinsing with DCM until it is white. Breaking up clumps in the sodium sulfate with a stir rod may be necessary in this case.

Concentration

a) Concentrate the eluates to 8-10 mL at 40-45 °C, either using SPeVAP or equivalent with a gentle stream of nitrogen, or a water bath and K-D apparatus.

b) Transfer eluate to a class-A graduated 25 mL jacketed concentrator tube, rinsing the vial twice with approximately 2 mL DCM to ensure full transfer of the sample.

c) Gently concentrate to approx. 0.6 - 0.8 mL at 35 °C using a gentle stream of nitrogen on an Organomation N-EVAP or equivalent, adjusting the needle position so a small 'dimple' is formed on the surface.

d) Remove from the water bath and rinse the sides of the concentrator tube with approx. 100 µL of DCM

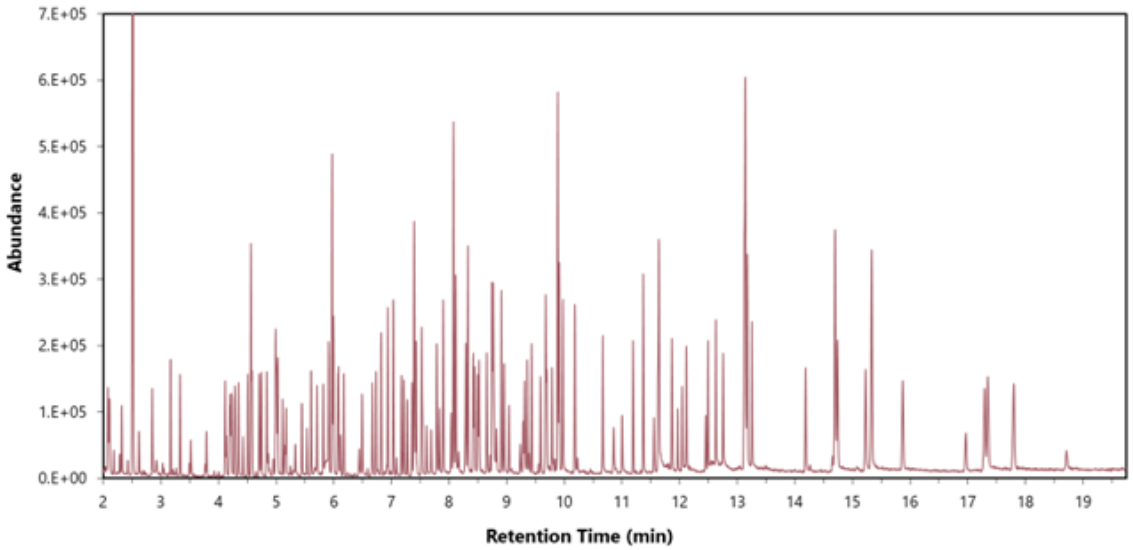
e) With a Pasteur pipette, mix the extract, rinsing the sides of the concentrator tube.

f) Transfer the extract to a GC vial and bring to a 1 mL final volume with DCM.

g) Add internal standard.

h) Analyze by GC/MS.

Note: *Concentration should occur immediately after the eluate drying step to ensure recovery for light sensitive compounds.*



Total Ion Chromatogram (TIC) of the 1L fortified sample at 20 µg/L (with internal standards at 40 µg/L). (133 Compounds).

Analytical conditions: GC-MS system: Agilent 6890/5975C; Restek Rxi-5Sil MS, 30m x 250 µm x 0.25 µm; Injection volume: 1µL split (1:10) at 280°C; GC liner: Restek Topaz Splitless, 4mm; Oven temp. program: 40°C (1 min) to 280 °C at 20 °C/min, 300 °C at 5 °C /min; Carrier gas: Hydrogen at 1.2 mL/min constant flow rate; Temperature: Transfer line = 280°C; Ion source = 230°C; Full scan range: 50-500 amu. Tune file: DFTPP.U

ENVIRO-CLEAN® METHOD 8270

Table 1. Quality Control Data.

*Compounds fortified at 10 µg/L
**1,4-Phenylenediamine could not be recovered at LLOQ

Analyte	IDP/LLOQ 5 µg/L*(n=4)		IDP 20 µg/L (n=4)		LOD µg/L (n=7)
	Average Recovery (%)	RSD (%)	Average Recovery (%)	RSD (%)	
1,4-Dioxane	73	8	61	16	1.28
N-Nitrosodimethylamine	89	4	78	14	1.02
Pyridine	85	4	73	13	1.12
Ethyl Methacrylate	87	7	70	14	1.19
2-Picoline	101	4	84	11	1.09
N-Nitrosomethylethylamine	100	12	88	11	1.91
Methyl Methanesulfonate	96	8	84	12	0.65
2-Fluorophenol	95	5	86	13	N/A (Surr)
N-Nitrosodiethylamine	86	4	85	15	1.09
Ethyl Methanesulfonate	95	10	81	13	1.50
Benzaldehyde	100	3	83	13	0.98
Phenol-d6	94	5	80	12	N/A (Surr)
Phenol	93	6	81	11	0.91
Aniline	65	4	68	12	0.55
Bis(2-chloroethyl) ether	91	8	79	14	0.99
Pentachloroethane	86	13	73	15	1.10
2-Chlorophenol	100	7	89	14	1/09
Acetophenone	105	4	94	9	0.97
1,3-Dichlorobenzene	83	2	70	16	0.62
1,4-Dichlorobenzene	80	4	71	16	0.31
Benzyl Alcohol	122	6	91	11	2.47
1,2-Dichlorobenzene	86	5	76	14	0.56
2-Methylphenol	96	5	89	11	0.90
2,2'-oxybis(1-chloropropane)	91	7	79	13	0.52
N-Nitrosopyrrolidine	81	3	83	12	0.70
3 and 4-Methylphenol	96	6	92	9	1.02
N-Nitrosodi-N-propylamine	87	2	97	11	1.30
4-Nitrosomorpholine	81	10	92	10	1.28
o-Toluidine	85	4	82	9	0.65
Hexachloroethane	87	1	76	19	0.77
Nitrobenzene-d5	89	8	84	11	N/A (Surr)
Nitrobenzene	95	5	84	13	1.31
N-Nitrosopiperidine	94	10	89	6	1.22
Isophorone	83	6	86	8	0.69
2-Nitrophenol	86	4	87	11	0.82
2,4-Dimethylphenol	90	5	91	8	0.60
Benzoic Acid*	80	27	71	12	6.28
Bis(2-chloroethoxy)methane	87	6	81	10	0.81
2,4-Dichlorophenol	96	10	99	9	1.28
1,2,4-Trichlorobenzene	88	5	81	12	0.53
Phentermine	103	5	89	3	1.36
Naphthalene	93	4	82	11	0.49
4-Chloroaniline	76	8	82	8	0.81
2,6-Dichlorophenol	90	2	93	8	0.52
Hexachloropropene	51	5	41	15	0.54
Hexachlorobutadiene	84	4	78	15	0.62
Caprolactam	105	8	90	6	2.24
N-Nitrosodi-n-butylamine	99	4	90	6	1.40
1,4-Phenylenediamine**	0	0	34	5	**
4-Chloro-3-methylphenol	94	6	95	4	0.77
Isosafrole I	88	6	88	8	0.72
2-Methylnaphthalene	95	4	85	9	0.59
1-Methylnaphthalene	91	4	84	9	0.44
Hexachlorocyclopentadiene	87	4	80	13	0.77
1,2,4,5-Tetrachlorobenzene	86	4	82	11	0.65
Isosafrole II	91	6	92	7	1.65
2,4,6-Trichlorophenol	97	4	100	8	1.09
2,4,5-Trichlorophenol	96	4	99	6	0.68
2-Chloronaphthalene	94	2	90	11	0.35
1-Chloronaphthalene	92	6	85	11	0.65
2-Fluorobiphenyl	87	2	85	8	N/A (Surr)
Safrole	85	4	90	9	0.88
1,1'-Biphenyl	93	4	89	9	0.55
Diphenyl Ether	88	2	91	8	0.61
2-Nitroaniline	82	3	94	6	1.16
1,4-Naphthoquinone	56	6	75	8	0.22
1,4-Dinitrobenzene	84	6	90	5	1.25

Table 1. *(continued)*

*Compounds fortified at 10 µg/L
**1,4-Phenylenediamine could not be recovered at LLOQ

Analyte	IDP/LLOQ 5 µg/L* (n=4)		IDP 20 µg/L (n=4)		LOD µg/L (n=7)
	Average Recovery (%)	RSD (%)	Average Recovery (%)	RSD (%)	
Dimethylphthalate	90	6	97	7	0.60
1,3-Dinitrobenzene	91	9	92	5	0.82
2,6-Dinitrotoluene	88	4	95	7	0.79
1,2-Dinitrobenzene	85	6	93	7	0.26
Acenapthylene	89	2	91	8	0.33
3-Nitroaniline	71	11	83	7	0.78
Acenaphthene	95	4	89	8	0.42
2,4-Dinitrophenol	98	14	76	7	1.92
4-Nitrophenol	93	17	95	6	2.05
Pentachlorobenzene	88	6	89	8	0.92
2,4-Dinitrotoluene	79	6	92	6	0.67
Dibenzofuran	94	5	91	7	0.47
1-Naphthylamine	62	8	87	6	1.04
2,3,5,6-Tetrachlorophenol	94	3	101	5	0.53
2,3,4,6-Tetrachlorophenol	99	6	100	4	0.71
2-Napthtylamine	64	6	84	5	0.63
Diethylphthalate	64	5	83	4	0.52
4-Chlorophenyl phenyl ether	90	3	95	8	0.55
Fluorene	92	3	91	6	0.41
4-Nitroaniline	81	9	93	6	1.29
4,6-Dinitro-2-methylphenol	112	4	91	2	0.94
N-Nitrosodiphenylamine	88	4	97	5	0.30
Diphenylhydrazine	80	5	93	6	0.56
2,4,6-Tribromophenol	106	8	109	5	N/A (Surr)
1,3,5-Trinitrobenzene	119	5	83	4	0.97
Phenacetin	113	4	103	3	0.66
Diallate	85	3	99	6	1.00
4-Bromophenyl phenyl ether	93	3	96	6	0.41
Hexachlorobenzene	93	7	99	6	0.68
Atrazine	117	4	89	2	0.78
Pentachlorophenol	109	7	114	3	1.11
4-Aminobiphenyl	62	7	81	3	0.91
Pentachloronitrobenzene	93	7	100	4	1.30
Phenanthrene	94	3	94	5	0.34
Propyzamide	79	10	97	5	0.89
Anthracene	84	5	93	5	0.48
Carbazole	89	5	97	3	0.47
Di-n-butylphthalate	112	5	100	2	3.25
4-Nitroquinoline-1-oxide	62	12	90	3	1.97
Methapyrilene*	70	8	86	4	2.48
Isodrin	93	6	101	5	1.21
Fluoranthene	90	3	97	4	0.25
Benzidine*	38	4	58	7	1.53
Pyrene	95	3	100	7	0.48
Aramite I	102	14	97	7	0.99
o-Terphenyl-D14	97	3	98	4	N/A (Surr)
Aramite II	84	10	85	5	1.02
p-Dimethylaminoazobenzene	105	4	111	4	0.93
3'3-Dimethylbenzidine*	57	5	121	6	0.86
Butylbenzylphthalate	108	4	97	5	1.08
Kepone	92	16	97	4	1.30
Bis(2-ethylhexyl)adipate	88	6	84	7	0.85
2-Acetylaminofluorene	76	2	95	4	0.44
3'3-Dichlorobenzidine	67	7	95	3	1.38
Benz[a]anthracene	84	4	97	6	0.18
Chrysene	84	2	95	6	0.40
Bis(2-ethylhexyl)phthalate	89	5	97	5	2.47
Di-n-octylphthalate	101	2	94	4	0.56
7,12-Dimethylbenzo[a]anthracene	87	4	93	5	0.78
Benzo[b]fluoranthene	95	4	106	4	0.53
Benzo[k]fluoranthene	87	4	95	7	0.67
Benzo[a]pyrene	86	2	91	6	0.61
3-Methylchloanthrene	84	5	89	6	0.40
Dibenz[a,j]acridine	52	4	56	9	0.86
Indeno[1,2,3-cd]pyrene	91	5	93	7	0.66
Dibenz[a,h]anthracene	89	6	91	6	0.57
Benzo[g,h,i]perylene	91	4	91	6	0.70

ENVIRO-CLEAN® METHOD 8270

PRICES AND TERMS

Our prices are subject to change without notice. The price in effect when we receive your order will apply. All prices are in US Dollars and are F.O.B. Lewistown, PA 17044. Terms of payment are net 30 days.

MINIMUM ORDERS

We welcome all orders, therefore, we do not have a minimum order requirement. When ordering, please include your purchase order number, complete "Ship To" and "Bill To" address, catalog number, quantity, and description of product(s). Also include your name and a phone number where you can be reached should we have any questions concerning your order.

SHIPMENTS

Normal processing is within 24 hours after receipt of an order. Unless special shipping requests have been made, our trained staff will send all orders by UPS Ground service. The appropriate shipping charges (freight & insurance costs) will be added to the invoice, unless otherwise instructed by the customer.

SPECIAL PRICING

We offer special pricing for volume purchases and standing orders. These discounts apply to bonded phase extraction column purchases only. Please call a sales representative for more information on special pricing qualifications.

RETURN POLICY

Our Quality Manager will handle all returns. Before returning merchandise, please call to obtain a return authorization number from the quality manager. We will need to know the reason for the return, date of purchase, purchase order number and invoice number in order to issue a return authorization number. Return merchandise must be received before a credit can be issued. Returns will not be accepted after 90 days. A restocking fee of 25% of the price paid, or a minimum of $25.00 (whichever is greater) will be charged on all returns.

WARRANTY

All products manufactured by UCT are guaranteed against defects in materials and workmanship for a period of 90 days after shipment. UCT will replace any items that prove to be defective during this time period. The exclusive remedy requires the end user to first advise UCT of the defective product by phone or in writing and must include order number, the lot number and the shipping date.

To initiate this action, photographs of the product, including packaging and labeling of the containers, must be submitted to the UCT Representative for approval. With approval a return authorization can be initiated, and must be received within 30 days. Once the materials arrive at UCT a further inspection of the materials must be completed and accepted by our Quality Manager prior to further action of credits or replacement. UCT's total liability is limited to the replacement cost of UCT products.

This warranty does not apply to damage resulting from misuse.

Placing An Order

Email: info@unitedchem.com
Web: www.unitedchem.com

MADE IN USA

4101-02-02

UCT, Inc.
2731 Bartram Rd.
Bristol, PA 19007

Phone: 800.385.3153
Fax: 215.785.1226
www.unitedchem.com

UCT ENVIRO